

A New Solid State Extractor Pulser for the FNAL Magnetron Ion Source

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A new solid state extractor pulser has been installed on the Fermi National Accelerator Laboratory (FNAL) magnetron ion source, replacing a vacuum tube style pulser that was used for over 40 years. The required ion source extraction voltage is 35 kV for injection into the RFQ. At this voltage the old pulser had a rise time of over 150 microseconds due to the di/dt limit of the vacuum tube. This along with the lifetime of the tubes, on the order of 3 months, the long lead time when ordering tubes, and the fact that there was only one manufacturer of them, led us to investigate solid state switches. The solid state switches in the new pulser are capable of 50 kV and 30 A pulses and are the same switches that we have installed in our Einzel lens chopper. When installed in the operating system they have a rise time of 9 microseconds and so far have been able to withstand frequent extractor sparks. This paper will discuss the pulser design and operational experience to date.